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ANALYSIS OF THE CORRELATION BETWEEN  
PSYCHOLOGICAL VARIABLES AND  
U. S. NAVY OFFICERS PROMOTION

John Francis Anderson

# NAVAL POSTGRADUATE SCHOOL

## Monterey, California



# THESIS

ANALYSIS OF THE CORRELATION BETWEEN  
PSYCHOLOGICAL VARIABLES AND  
U.S. NAVY OFFICER PROMOTION

by

John Francis Anderson

Raiford Wilson Cooper, Jr.

June 1976

Thesis Advisors:

J. D. Senger

R. A. Weitzman

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Pearson product-moment correlations which related each of the 50 test variables to a promotion index were analyzed. Nine of the personality variables were found to be statistically significant at the .05 level or greater. Additionally, a multiple correlation stepwise regression analysis was conducted which resulted in a correlation of .426 (N = 205).

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PSYCHOLOGICAL VARIABLES AND U. S. NAVY OFFICER PROMOTION

by

John Francis Anderson  
Lieutenant Commander, Supply Corps, United States Navy  
B.A., Colgate University, 1963

Raiford Wilson Cooper, Jr.  
Lieutenant, Supply Corps, United States Navy  
E.A., Birmingham-Southern College, 1966

Submitted in partial fulfillment of the  
requirements for the degree of

MASTER OF SCIENCE IN MANAGEMENT

from the  
NAVAL POSTGRADUATE SCHOOL  
June 1976



## ABSTRACT

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## I. INTRODUCTION

### A. STATEMENT OF PURPOSE

The purpose of this thesis is to relate psychological variables and personal data to promotion results on a group of former Naval Postgraduate School (NPS) students in order to determine those variables which contribute most to predicting success in the United States Navy. Success, in this context, is interpreted to mean selection for promotion.

### B. IDENTIFICATION OF HYPOTHESIS

The attainment of skills and the ability to perform specific tasks do not necessarily reflect and/or guarantee the extent to which an individual will succeed in his chosen profession. It is hypothesized that there are certain psychological factors which are highly related to success. An extension of this hypothesis is that these variables can be utilized to predict who will be successful in the Navy and, on the other hand, who will be unsuccessful (i.e. passed over for promotion).

This study was based primarily on results of personality tests given to NPS students from the Management curriculum by Dr. John E. Senger during the period 1965-1972. To enable the information to be of greatest significance to the

authors and to be analyzed in as objective a manner as possible, international officers and officers from other U. S. military services were removed from consideration at the outset. The participants in this study were individuals of varying ages, ranks, backgrounds and experiences. One general assumption was made regarding the personal characteristics measured by the various tests at this point in the individual's career: it was assumed that these characteristics were stable over the course of a career. This assumption is not unusual as various studies have indicated that personality characteristics tend to be stable over time (Tyler, 179-181). This study, therefore, included the promotion history of all individuals before entering NPS and taking the tests and their subsequent promotion patterns.

## II. SURVEY OF RELATED LITERATURE

Numerous studies relating to managerial success and managerial effectiveness have been conducted over the past two decades. Factors have been analyzed in determining relationships between measures of occupational mobility, job performance, promotion, leadership and high-earning capability and measures of academic ability, intelligence, extracurricular activities, peer and superior ratings, personal history data and personality variables. The following studies are representative.

Mahoney, Jerdee and Nash attempted to determine the personal characteristics possessed by "more effective" as opposed to "less effective" managers. They developed the following general description of the "more effective" manager:

"The 'more effective' manager is somewhat more intelligent than the 'less effective' manager; his vocational interests are more similar to the interests of sales managers, purchasing agents, and manufacturing company presidents; and they are less similar to the interests of men engaged in biological sciences and technical crafts...; he tends to be more aggressive, persuasive, and self-reliant; he has had more educational training and was more active in sports and hobbies as a young man...." (Mahoney, 161).

Grimsley and Jarrett assessed executive success characteristics by comparing mean scores on various psychometric instruments taken by their two study groups: top managers and middle managers (differentiated by level of responsibility held) within the same age range. The AVL Study of Values was one of the tests utilized and indicated that top managers ranked higher than middle managers in all

aspects of this test except Religious. (Appendix A lists and defines the variables of the AVL).

In the same study, top managers were compared with the norm group (employed males) and the top managers scored significantly higher in Economic and Political, higher in Theoretical, lower in Social, and significantly lower in Aesthetic and Religious (Grimsley, 38).

Huttner, Levy, Rosen and Stopol also investigated the differences between more and less effective executives with the following general results: more effective executives tended to be more intelligent, less error prone and more knowledgeable. In addition, as pertains to personality, the more effective executive possessed more drive and enthusiasm while being less anxious, more optimistic and more trusting than the less effective executives (Huttner, 46-47).

Korman provided a comprehensive review of research relating to predicting managerial success up to 1968. Based on this analysis, Korman concluded that:

1. Intelligence is a fair predictor regarding success at the first-line supervisory level but not at higher-level managerial positions.

2. Objective personality inventories (such as those utilized in this study) have generally not shown predictive validity.

3. Personal history data rates with intelligence as a predictor of success.

4. Judgmental methods, such as peer ratings, are generally better predictors than psychometric measures (Korman, 319).



Kraut also found that judgmental evaluations were effective predictors of success when applied to top management personnel. However, it was pointed out, most of the work on peer rating evaluations up to this time had been done within the military community. In general, it was found that peer ratings were quite reliable and had significant predictive validity in assessing success in training, promotion and job performance (Kraut, 14).

In the latest known study involving various factors analyzed in relationship to success in the military, O'Connell studied known factors pertaining to United States Air Force Academy graduates (Classes of 1964 and 1965) and their relationship with active duty performance which included retention and early promotion to the rank of Major - equivalent to Lieutenant Commander in the U. S. Navy. This investigation is of particular interest to this study. O'Connell determined that success in the military was based on a highly complex interaction of variables, with prediction being a very difficult undertaking. It is stated that:

"depending on what criterion one uses to measure active duty performance, depending on what class one analyzes, and depending on what variables one includes as possible predictors, different conclusions and interpretations emerge." (O'Connell, 23)

Specific results from O'Connell's study indicate that for the Class of 1964 (N = 262), early promotion was mainly related to good military ratings while at the Academy; whereas, for the Class of 1965 (N = 290), either a high academic standing or good peer ratings while at the Academy were most indicative of promotion. No personality characteristics were evaluated in this study; however, intelligence indicators (e.g. Grade Point Average, Graduate Record Exam scores) and many service academy variables (e.g. Graduate Order of Merit, officer rating and military rating)

were considered. Peer ratings in one sample were again found to be indicative of success which coincides with findings by Korman and Kraut.

Harrell has conducted research over a number of years which has shown that how an individual performs and how successful the individual is depends to a large extent on the individual's personality. Harrell's initial review depicted that successful business leaders rank especially high in verbal and numerical ability while the most important personality characteristics are drive (the will to control energy in pursuit of a goal), confidence, enthusiasm, dominance and aggressiveness (Harrell, 1961, 162-174).

Harrell's continuing research since the early 1960's on business success of MBA graduates from the Stanford Graduate School of Business is especially closely related to this study. Harrell has utilized similar techniques such as personality inventories (including the MMPI) in conjunction with intelligence indicators in an effort to predict success.

In 1969, utilizing monetary earnings five years after graduation from Stanford as the single best criterion to determine success, Harrell concluded that higher earners had distinctly different personalities than the lower earners. High earners scored in the socially desirable direction on the personality measures and, in general, were characterized as showing a higher energy level, greater personnel and management interests and more self-confidence than low earners - in addition to working longer hours and achieving greater job satisfaction (Harrell, 1969, 457-463).

Another study by Harrell considered attainment of general management position by the MBA's as the success

criterion as opposed to performance in a specialist position. Results similar to the 1969 study were discovered. Certain factors (Psychopathic Deviates, Paranoia, Hypomania and Social Introversion) on the MMPI (specifically noted because of the MMPI's inclusion in this study) were considered significant toward attaining success and as reflections of intensity, sincerity, high energy level, social extroversion and a need for autonomy or independence (Harrell, 1973, 127-134).

In general, the above findings seem to indicate that personality is considered to play a major part in the success or failure of an individual in a chosen career field.

### III. METHODOLOGY

#### A. SUBJECTS

As noted in the Introduction, the population for this study are former NPS students (U. S. Navy only) from the Management curriculum. This fact must be kept in mind when analyzing these findings. These officers had been critically evaluated and selected for NPS attendance and generally were more successful or considered to have more potential for success and to be more academically qualified than an average officer group.

Results from four personality tests (A-S Reaction Study, Allport-Vernon-Lindzey Study of Values, Edwards Personal Preference Schedule and the Minnesota Multiphasic Personality Inventory), the Graduate Record Examination and a final grade point average at NPS were available for analysis on this group of 205 Naval officers.

## B. MEASURES

The following instruments were utilized in the measurement of personality characteristics:

A-S Reaction Study (AS)

Allport-Vernon-Lindzey Study of Values (AVL)

Edwards Personal Preference Schedule (EPPS)

Minnesota Multiphasic Personality Inventory (MMPI)

A total of 47 specific measures of characteristics are available from these tests. In addition, Graduate Record Exam (GRE) scores (both Verbal and Quantitative) and the final Grade Point Average (GPA) attained at NPS were analyzed with the personality characteristics.

The personality tests and intelligence variables considered are described below. The individual variables are defined in Appendices A through C, as applicable.

### 1. A-S Reaction Study

The A-S test is a scale for measuring Ascendance-Submission in personality. The purpose of this behavior study is to discover an individual's disposition towards dominance over other individuals (or towards being dominated by them). It is a test which requires sincere and thorough cooperation by the participants in responding to the questions aimed at describing various face-to-face relationships of everyday life. A positive score indicates ascendance while a negative score denotes submissive reactions (Allport and Allport, 2-8). Maximum and minimum



scores which can be obtained are  $\pm 79$ . The range of scores attained by the sample group in this study were from +57 to -32 with 71% scoring in the positive area.

## 2. Study of Values

The Study of Values or the Allport-Vernon-Lindzey (AVL) scale is used for measuring the relative prominence of the following six basic favorable interests or motives in personality:

1. Theoretical
2. Economic
3. Aesthetic
4. Social
5. Political
6. Religious

The above factors are described in greater detail in Appendix A. This scale is based on the view that personality is best revealed through a person's values or his evaluative attitudes as stated in Edward Spranger's Types of Men (Allport and others, 1939, 3). Spranger believed, and the test is set up to evaluate that a person is best understood by his interests and intentions rather than by his achievements. In this manner, although an individual can be characterized mainly in terms of a single value, a combination of the six values is possible (Fischer, 401).

This test was designed for use with adults with some college education - this fact makes it especially worthwhile in analyzing its impact on this study of former NPS students.



### 3. Edwards Personal Preference Schedule

The EPPS is designed to measure the following 15 relatively independent normal personality variables originally developed by H. A. Murray in his list of human needs. They are described in greater detail in Appendix B.

Achievement	Affiliation	Nurturance
Deference	Intraception	Change
Order	Succorance	Endurance
Exhibition	Dominance	Heterosexuality
Autonomy	Abasement	Aggression

This test attempts to minimize the influence of social desirability in response to each item. The participant must choose between two statements of comparable social desirability value in that an affirmative response indicates that the statement is characteristic of the participant and a negative response indicates the statement is not. A difference in test design between the EPPS and other tests considered is that one need is compared against another need in determining strength of a trait rather than each trait being measured absolutely.

In addition to the 15 traits measured, 15 items on the test are duplicated in order to determine a test consistency score (Edwards, 1-15).

#### 4. Minnesota Multiphasic Personality Inventory

The MMPI presently is designed to provide an objective assessment of some of the major personality characteristics that affect personal and social adjustment (Dahlstrom and Welsh, 3). The 24 factors pertaining to this test are listed below and described further in Appendix C. It should be noted that the first three variables listed (i.e. Lie Score, Interpersonal Feelings and Defensiveness) are "internal" scores designed to assess the test-taking set of the testee.

Lie Score	Paranoia	Low Back Pain
Interpersonal Feelings	Psychasthenia	Caudality
Defensiveness	Schizophrenia	Dependence
Hypochondriasis	Hypomania	Dominance
Social Responsibility	Social	Depression
Hysteria	First Factor	Prejudice
Psychopathic Deviates	Second Factor	Social Status
Male Sexual Inversion	Ego Strength	Control

This inventory was developed to determine what characteristics distinguished psychiatric patients from normal individuals. It has been modified over time to measure basic traits rather than to be used as a predictive device (Jackson, 779-780). The MMPI continues to be widely used and is widely acclaimed; however, it has become controversial because of its neurotic and psychotic questions. Harrell recently decided to drop it from consideration in his on-going research to evaluate executive success (Harrell and Harrell, 1975, 2).

## 5. Graduate Record Examination (GRE)

The GRE - a test prepared by the Educational Testing Service of Princeton, N.J. - is widely used to determine student aptitude performance in the area of postgraduate education. The examination has two basic parts, verbal and quantitative. The verbal section includes verbal reasoning and reading comprehension. The quantitative part deals with mathematical problems involving arithmetic reasoning, algebra and interpretation of graphs and diagrams (Wyatt and Knapp, 3).

Minimum and maximum scores on the GRE are 200 and 800 with a mean of 500. The range of scores from the sample group were from 350 to 790 for quantitative with a mean of 590, and 250 to 800 for verbal with a mean of 518.

6. Final NPS Grade Point Average (GPA)

The GPA is the individual's weighted score based on NPS standards ranging from Excellent (A) to Failing (X). Points are assigned based on grades attained as follows with adjustments made for plus or minus performance factors:

<u>GRADE</u>	<u>POINT VALUE</u>
A	4.0
B	3.0
C	2.0
D	1.0
X	0.0

The value of a course (credit hours) is multiplied by the point value of an individual's grade and the various multiplied (weighted) values are then added together. A final grade point average is obtained by dividing this total by the total number of credit hours. The final GPA utilized in this study considers the individual's overall academic performance while at NPS. Performance at the 3.0 level is generally required for graduation. The range of scores attained by this study's sample group were from 2.01 to 4.0 with a mean of 3.29.

### C. CRITERION: THE PROMOTION INDEX

The criterion or Promotion Index utilized in this study is referred to as the Overall Standardized Individual Average (STDAVER) in the computer program. It is a numerical value developed by converting non-numeric data (early promotion, normal promotion, late promotion and passed over for promotion information) into a format appropriate for utilization in this analysis. It was necessary to assume that the distribution of selection results to each rank followed the Normal Distribution. Millard utilized this criterion development approach effectively in his factor analysis of Marine Corps performance evaluation reports (Millard, 29-32).

Though the final sample for this study was made up of 205 officers for whom there was similar data available, 435 participants were initially identified for consideration. This number was subsequently reduced to 415 for various reasons. The largest group eliminated was 17 participants who had yet to be considered for selection to Lieutenant Commander - the rank considered by the authors to be indicative of the first realistic chance for an officer to be promoted ahead of his normal promotion pattern.

Pertinent promotion statistics for this group of 415 officers are included in the following breakdown:

1. Thirty-eight early selectees (9.2% of the population)
2. Thirteen officers who experienced selection late after being passed over (3.1%)



3. Thirty-three officers passed over for either Lieutenant Commander or Commander (8%)

4. Fifty-two officers passed over for the rank of Captain (12.9%)

5. Seventy-two officers promoted to Captain (17.9%)

There are four possible actions which can be taken regarding the promotability of an individual when considered for promotion. The individual may be selected early and therefore be promoted ahead of his contemporaries; he may be selected on time or according to the normal promotion pattern; he may be selected late and therefore be promoted after his contemporaries; or he may be passed over for promotion which denotes he is not qualified to be promoted at that time. The general trend is that as an individual advances during his career, the opportunity for early selection decreases and the opportunity to be denied promotion increases primarily because the number of officers required at the higher ranks become fewer and the competition gets much stronger. The promotion pattern of the 415 officers utilized in this study are described below by rank:

	<u>LCDR</u>	<u>CDR</u>	<u>CAPT</u>
EARLY *	18	21	4
NORMAL	394	273	66
LATE	2	9	2
PASS OVER	1	32	52

\* Early selectees total 43 in this listing as five individuals were early selected for both LCDR and CDR.

The percentages of promotion success derived from the



above table for individuals from this study rank very favorably with the general pattern of the late 1960's - early 1970's promotion board results:

PROMOTION RESULTS (PERCENTAGES)

	<u>LCDR</u>	<u>CDR</u>	<u>CAPT</u>
PARTICIPANTS IN THIS STUDY	99.8	90.4	58.1
OVERALL	79.1	74.3	56.7

These figures graphically illustrate that the individuals included in this study are successful officers and therefore are excellent subjects to be evaluated in an attempt to determine what psychological characteristics might be most indicative of promotability.

The criterion (Promotion Index) is based on the promotion history data for the 415 officers who attended NPS between 1965 and 1972. The frequency (FREQ), relative frequency (RF) which was determined by dividing the frequency for each result by the total number of observations and represented by a decimal, cumulative relative frequency (CRF) and standard normal deviate (Z-VALUE) for every possible selection result at each rank (LCDR, CDR, and CAPT) were determined. For example, the results of opportunity for selection to CDR are shown in Table I. This Table is based on 335 persons eligible for promotion or consideration for promotion to CDR from the population of 415 officers (80 officers were not yet eligible for promotion).

TABLE I

<u>DISTRIBUTION OF CDR PROMOTION RESULTS</u>				
<u>RESULT</u>	<u>FREQ</u>	<u>RF</u>	<u>CRF</u>	<u>Z-VALUE</u>
PASS OVER	32	.0955	0.0955	-1.3135
LATE	9	.0296	0.1224	-1.1630
NORMAL	273	.8149	0.9373	+1.5325
EARLY	21	.0627	1.0000	...

The mean, or expected value of each of these possible occurrences, denoted by  $\bar{x}$ , was calculated as follows:

$$(III-1) \quad \bar{x} = \frac{\int_{z_1}^{z_2} X f(X) dx}{\int_{z_1}^{z_2} f(X) dx}$$

where  $z_1$  and  $z_2$  are the minimum and maximum standard normal deviates of the result and  $f(X)$  is the distribution function of the results within the interval  $[z_1, z_2]$ . Since a normal distribution has been assumed,  $f(X)$  is given by:

$$(III-2) \quad f(X) = \frac{1}{\sqrt{2\pi}} \left[ e^{-1/2X^2} \right] \quad (-\infty < X < \infty)$$

After substitution and integration, the desired scale values are given by:

$$(III-3) \quad \bar{x} = \frac{\frac{-1}{\sqrt{2\pi}} \left[ \left( e^{-1/2 z_2^2} \right) - \left( e^{-1/2 z_1^2} \right) \right]}{F(z_2) - F(z_1)}$$

where the numerator can be determined by direct substitution of the z-values and the denominator can be determined from a table of areas under the standard normal curve.

For illustration purposes, let  $\bar{x}_p$  denote the value of a passover to CDR:

$$(III-4) \quad \begin{aligned} \bar{x}_p &= \frac{\frac{-1}{\sqrt{2\pi}} \left[ \left( e^{-1/2 (-1.3135)^2} \right) - \left( e^{-1/2 (-\infty)^2} \right) \right]}{F(-1.3135) - F(-\infty)} \\ &= \frac{-(0.3989) (0.4220 - 0)}{(0.0955)} \\ &= -1.7627 \end{aligned}$$

Similar values were determined for each possibility relating to promotion for the three ranks being evaluated.

These results were then linearly transformed to develop a criterion scale. The transformation was of the form:

$$T = 100 + 15(X)$$

where X is the scale value obtained by equation (III-3) and T is the more meaningful transformed value having a mean of

100 and a standard deviation of 15. The results of this transformation are shown in Table II:

Table II  
TRANSFORMED VALUE SCALE

	<u>LCDR</u>	<u>CDR</u>	<u>CAPT</u>
PASS OVER	53	74	86
LATE	61	81	97
NORMAL	99	101	109
EARLY	132	129	134

The applicable T values obtained from Table II were then used to represent the promotion history of each individual. The values for each promotion opportunity were added together and then divided by the number of opportunities to determine the individual's Promotion Index - the criterion utilized throughout this study.

#### D. DATA FORMAT

The raw data for this study was a combination of test results maintained by Dr. Senger over many years and biographical and criterion data (including promotion history) researched and developed by the authors. In order to ensure that invasion of privacy was not violated, specific individuals considered in this study are not identifiable by any means of input or output. Records were arranged in alphabetic order utilizing a three digit number which is paired with a four to six digit test identification number assigned previously to the individual by Dr. Senger.

Raw data has been assembled in accordance with the format depicted in Appendix D. Each individual's data was included in a set consisting of the following seven cards:  
Card 1 - Blank (used as a divider between cases)

Card 2 - Biographical data (begins with the three digit assigned number and the four to six digit test identification number and concludes with the year entered NPS; complete description of codes used also found in Appendix D)

Card 3 - AVL scores, the A-S Reaction Study score (listed as ASCEND) and the California "F" Test score<sup>\*</sup> (listed as CALIFF)

Card 4 - Variable scores from the EPPS

Card 5 - Variable scores from the MMPI

Card 6 - Variable scores from the CPI\*

Card 7- Standard scores developed as the Criterion - Promotion Index (explained above in Section III C)

\* Results of these tests are not included in the sample under consideration in this study, because their inclusion would have restricted the sample size.

This data, which has been extensively developed, purified and reviewed, is listed in Appendix E if required for future study.



## E. STATISTICAL ANALYSIS

The Statistical Package for the Social Sciences (SPSS) - Multiple Regression Analysis: Subprogram Regression - was utilized to perform regression and correlation analyses on the sample data and the criterion.

Representation of all variables in the data bank was possible if the SPSS pairwise deletion option was used, however, the results then generated were less reliable than those from the listwise option which considers only cases where all subjects involved have scores for all test variables. The latter option was adopted, therefore, for the study reported here.

#### IV. RESULTS

##### A. PEARSON CORRELATION ANALYSIS

Pearson product-moment correlation coefficients, depicting the strength of association between the promotion index and each variable, were derived from the computer program considering 205 cases. As noted in Section III A, the sample of 205 individuals had scores for the GRE, a final NFS GPA and scores on the four personality tests considered. Table III is provided because relatively strong variables (on an individual basis) can be ruled out through cross-measurement by other related variables during multiple regression analysis. Coefficients of  $-.00$  reflect negative correlations having a third digit less than 5.

Surprisingly none of the MMPI variables determined to be of any significance by Harrell (Section II) in attaining general management position - i.e. Psychopathic Deviates, Paranoia, Hypomania and Social Introversion - were highly related to U.S. Navy success/promotion.

TABLE III  
PRODUCT-MOMENT CORRELATIONS  
BETWEEN TEST VARIABLES AND THE CRITERION

<u>r</u>	<u>TEST</u>	<u>VARIABLE</u>
.10	GPA	
.12	GRE	Math
.01	GRE	Verbal
.08	ASCEND	
.06	AVL	Theoretical
.04	AVL	Economic
.00	AVL	Aesthetic
-.09	AVL	Social
.12	AVL	Political
-.10	AVL	Religious
*	.15	EPPS Achievement
	.03	EPPS Deference
	.06	EPPS Order
-.00	EPPS	Exhibition
-.01	EPPS	Autonomy
.04	EPPS	Affiliation
.01	EPPS	Intraception
-.06	EPPS	Succorance
.12	EPPS	Dominance
*	-.16	EPPS Abasement
	-.07	EPPS Nurturance
	-.13	EPPS Change
	.05	EPPS Endurance
-.01	EPPS	Heterosexuality
.01	EPPS	Agression
.12	EPPS	Consistency Score
**	.23	MMPI Lie Score
	-.10	MMPI Validity
	.11	MMPI Correction Factor
**	-.19	MMPI Hypochondriasis
	-.08	MMPI Depression
	.01	MMPI Conversion Hysteria
	-.11	MMPI Psychopathic Deviates
	-.00	MMPI Male Sexual Inversion
	.04	MMPI Paranoia
*	-.17	MMPI Psychasthenia
	-.11	MMPI Schizophrenia
	-.02	MMPI Hypomania
	-.04	MMPI Social Introversion
*	-.15	MMPI First Factor
	.07	MMPI Second Factor
**	.18	MMPI Ego Strength
	.06	MMPI Low Back Pain
*	-.14	MMPI Caudality
**	-.22	MMPI Dependency
	.05	MMPI Dominance
	.06	MMPI Social Responsibility
	-.12	MMPI Prejudice
	.03	MMPI Social Status
	-.06	MMPI Control

Coding used above:

- \* - Significant at .05 level
- \*\* - Significant at .01 level

Nine of the 50 variables analyzed in the preceding table are statistically significant at the .05 level or greater. These variables are considered to be significantly related to being successful in the U. S. Navy or, in other words, to contribute to one's promotability.

Six other variables significant at the .10 level are considered by the authors to be worthy of mention. They are MATH (GRE), POLITICAL (AVL), DOMINANCE (EPPS), CHANGE (EPPS), CONSISTENCY (EPPS) and PREJUDICE (MMPI). MATH, POLITICAL, DOMINANCE and CONSISTENCY correlated positively with the criterion.

Listed in Table IV are the correlation coefficients (sign only) between the Promotion Index and the 50 variables available for evaluation, as hypothesized by the authors and as actually derived from the computer program.

Based on this sample group, 35 or 70% of the variables were correctly predicted thereby supporting the authors' hypothesis.

TABLE IV  
CORRELATION RESULTS

<u>HYPOTHESESIZED</u>	<u>ACTUAL</u>	<u>TEST</u>	<u>VARIABLE</u>
+	+	GPA	
+	+	GRE	Math
+	+	GRE	Verbal
+	+	ASCEND	
-	+	AVL	Theoretical
-	+	AVL	Economic
-	+	AVL	Aesthetic
-	-	AVL	Social
+	+	AVL	Political
-	-	AVL	Religious
+	+	EPPS	Achievement
+	+	EPPS	Deference
+	+	EPPS	Order
-	-	EPPS	Exhibition
-	-	EPPS	Autonomy
+	+	EPPS	Affiliation
+	+	EPPS	Intracception
+	-	EPPS	Succorance
+	+	EPPS	Dominance
-	-	EPPS	Abasement
+	-	EPPS	Nurturance
+	-	EPPS	Change
+	+	EPPS	Endurance
+	-	EPPS	Heterosexuality
-	+	EPPS	Aggression
+	+	EPPS	Consistency Score
+	+	MMPI	Lie Score
-	-	MMPI	Validity
-	+	MMPI	Correction Factor
-	-	MMPI	Hypochondriasis
-	-	MMPI	Depression
-	+	MMPI	Conversion Hysteria
-	-	MMPI	Psychopathic Deviates
-	-	MMPI	Male Sexual Inversion
-	+	MMPI	Paranoia
-	-	MMPI	Psychasthenia
-	-	MMPI	Schizophrenia
+	-	MMPI	Hypomania
-	-	MMPI	Social Introversion
-	-	MMPI	First Factor
-	+	MMPI	Second Factor
+	+	MMPI	Ego Strength
-	+	MMPI	Low Back Pain
-	-	MMPI	Caudality
-	-	MMPI	Dependency
+	+	MMPI	Dominance
+	+	MMPI	Social Responsibility
-	-	MMPI	Prejudice
+	+	MMPI	Social Status
-	-	MMPI	Control



## B. UNEXPECTED RESULTS

Four factors commonly associated with success in leadership activities are verbal intelligence, endurance, dominance and responsibility. However, the results from Table III show these coefficients to be near zero:

.01 : GRE - Verbal  
.05 : Endurance (EPPS)  
.05 : Dominance (MMPI)  
.06 : Social Responsibility (MMPI)

## C. MULTIPLE CORRELATION ANALYSIS

The 205 cases (1965-1968 period) utilized in this regression analysis had scores for the following test variables: GRE, GPA, AVL, AS, EPPS and MMPI. The ten independent variables most highly correlated with promotion (one from the AVL, four each from the MMPI and the EPPS and the GRE Math) were chosen and are expressed in the following equation. This equation is primarily utilized to determine a Promotion Index for cross-validation and prediction purposes by adding the constant (90.77) with the values derived by multiplying the scores on the indicated variables with the appropriate coefficients:

PREDICTED SCCRE (to be compared with the Criterion) =

90.77   +.26 (Lie Score - MMPI)  
          -.14 (Hypochondriasis - MMPI)  
          -.15 (Abasement - EPPS)  
          -.23 (Change - EPPS)  
          +.12 (Political - AVL)  
          +.01 (GRE Score - Math)  
          -.19 (Dependency - MMPI)  
          +.14 (Caudality - MMPI)  
          +.24 (Affiliation - EPPS)  
          -.18 (Nurturance - EPPS).

These ten variables yielded a moderately high multiple correlation coefficient of .426 explaining .181 of the total variance of the dependent variable: Promotion Index. "F" values were all significant at the .05 level.

#### D. CORRELATION AMONG SELECTED VARIABLES

The results of the correlation analysis re-emphasize the fact that tests do not always test what they are intended to test. Three of the inventories are intended to measure a need for power, i.e. the AVL Political, EPPS Dominance and the MMPI Dominance variables. Results below indicate that their intercorrelations are much lower than one would expect:

TABLE V  
POWER NEED CORRELATIONS

	<u>CRITERION</u>	<u>AVL</u>	<u>EPPS</u>	<u>MMPI</u>
AVL	POLITICAL	.12	---	.18
EPPS	DOMINANCE	.12	.18	---
MMPI	DOMINANCE	.05	.06	.22

## V. ANALYSIS

Based on Pearson product-moment correlation results utilizing data on 205 subjects - GRE, GPA, AVL, AS, EPPS and MMPI - a general description of the successful Naval officer emerged.

He is an active, vigorous, achieving, emotionally stable, self-confident individual who tends to be personally defensive.

Considering regression results utilizing the same data another general description of the promotable individual emerged.

Again he seems to be a psychologically healthy, self-sufficient, stable, dominating individual who tends to be defensive. In this analysis, he also was found to be intelligent and friendly but not particularly warm and supportive. This multiple correlation analysis does indicate less emotional stability (a positive Caudality score) than does the Pearson analysis.

Although these descriptions, which more or less emphasize socially desirable and leader oriented traits, indicate what one might have perceived as being indicative of success (in the U. S. Navy), they have more substance at this point in that they are based on tested relationships and not just educated guesses. However, utilizing the factors generated by the multiple regression procedure (Section IV D 1 equation) did not prove very successful in predicting promotion success on a small cross-validation

sample. Fifty-nine percent overall accuracy was evidenced, however, only 25% prediction success was noted in early promotion and pass over results. This is an indication that more than the psychological variables considered by this study need to be known in order to actually predict promotion success.

A complex set of confounding variables exist which significantly affect an individual's success or failure (in the Navy) - apart from personality and intelligence. The following non-inclusive list of variables plays a large part in determining who will be successful as regards promotion in the Navy:

- 1) Duty performance based on Fitness Reports
- 2) Changing membership(s) on selection boards each year
- 3) Changing criteria used by selection boards
- 4) Reputation (or lack thereof) of the individual
- 5) Training and/or work experience
- 6) Exposure to leadership and management practices
- 7) Attitude of reporting senior to individual and to the report system
- 8) Exposure based on assignment locations

A number of unusual combinations (such as late promotion to LCDR and subsequent early promotion to CDR, and late promotion to CDR and normal promotion to CAPT) amongst the promotion histories uncovered during this study further indicate that more is involved than stable psychological factors in determining success.

## VI. SUMMARY AND CONCLUSIONS

This study investigated the relationship between promotion success in the U. S. Navy and known psychological data (50 test variables) on a group of Naval Postgraduate School students - primarily 205 individuals who attended graduate school in the 1965-1968 time frame.

Nine personality variables (seven from the MMPI) were found to be statistically significant based on Pearson product-moment correlations.

A correlation of .426 was achieved utilizing a multiple correlation stepwise regression analysis which considered four personality tests (AVL, AS, EPPS and MMPI), GRE and GPA scores and the Promotion Index.

Generally unsuccessful cross-validation results and unusual individual promotion pattern occurrences discovered during the course of this study lead the authors to the following conclusions.

The personality of an individual and, more importantly, some specific characteristics of that personality - such as independence, self-confidence, superiority and a need to achieve - contribute to success. Intelligence indicators (especially verbal ability) are determined to be relatively unrelated. Although these characteristics are indicative of success in the Navy, the contribution of other variables - primarily the confounding variables stated in the previous section - need be known in order to predict promotion success with greater accuracy.



There is no simple predictive success formula. Success is a function of many variables and predicting promotion is most definitely not an exact science. This study does contribute to an understanding of some of the kinds of personality variables related to success amongst the sample group.

## VII. RECCMMENDATIONS FOR FURTHER INVESTIGATIONS

### A. STUDIES WITH AVAILABLE DATA

The fcllwing recommendations are listed for further study utilizing data generated from this thesis:

1. Analysis of promotion results for each individual rank - Lieutenant Commander, Commander and Captain. Initial investigation indicated that different variables for the most part are selected in explaining promotability at different ranks.

2. Extreme case analysis such as:

a. the 38 early selectees with the 85 total passovers, or, alternatively, the 33 passovers prior to consideration for Captain.

b. the 52 passovers to the rank of Captain and the 72 successful cases.

This technique was effectively utilized by Harrell in evaluating personalities of high earning MBA's when he considered two groups - the top one-third earners and the low one-third.

3. Continued analysis of biographical data - the only information of this nature utilized in this study was GRE scores and final GPA attained at NPS. Since the GRE

scores were not highly correlated to success, the authors recommend their removal as factors in future studies. This will enable up to 63 cases (previously not considered because of missing GRE data) to be included in future analyses. For example, future analysis could compare the following sub-groups:

a. Officer Candidate School graduates with U. S. Naval Academy graduates.

b. Naval Academy graduates with graduates from other schools rated 7 (the highest academic ranking) in accordance with selectivity measures from Astin's book, Predicting Academic Performance in College.

c. Various biographical data such as marital status, children status, rank and designator with academic success at NPS.

d. Success in the Navy by designator.

4. Extensive cross-validation of predicted success results - efforts in cross-validating the results of this study at various stages of development were conducted with imperfect results. (It is suggested that a stratified random sample be used.)

## B. STUDIES WITH ADDITIONAL DATA

The following recommendations are listed for further study requiring use of additional data:

1. Incorporation of the most recent (1973-1976) test results to expand the data base of tests already considered in an effort to develop firmer conclusions.
2. In addition, the incorporation of results on the Least Preferred Co-Worker Test which was administered only to the most recent students.

## APPENDIX A

### AVL VARIABLES DEFINED

This information was summarized or taken from the Study of Values Manual by Allport, Vernon, and Lindzey. Due to the limitation of "reserved" words in the SPSS program, the code used in item description below and in subsequent appendices is matched with coding used in the SPSS Program Control Cards (see Appendix E) and this study, but not necessarily with the coding used in the actual test manuals.

1. TH Theoretical: The dominant interest of the theoretical man is the discovery of truth, he characteristically takes a "cognitive" attitude, i.e. one that looks for identities and differences; one that divests itself of judgments regarding the beauty or utility of objects, and seeks only to observe and to reason; an intellectualist, frequently a scientist or philosopher; his aim is to order and systematize his knowledge.

2. EC Economic: The economic man is characteristically interested in what is useful; based originally upon self-preservation; embraces the practical affairs of the business world (the production, marketing, and consumption of goods, the elaboration of credit, and the accumulation of tangible wealth); is thoroughly practical and conforms to the typical stereotype of the average American businessman; wants practical education; regards unapplied knowledge as wasteful; is likely to confuse luxury with beauty; considers God as the giver of good gifts, of

wealth, prosperity, and other tangible blessings.

3. AE Aesthetic: The aesthetic man sees his highest value in form and harmony and judges each single experience from the standpoint of grace, symmetry or fitness; regards life as a procession of events; each single impression is enjoyed for its own sake; he is not necessarily effete or a creative artist, but need only find his chief interests in the artistic episodes of life; in social affairs he may be said to be interested in persons but not in the welfare of persons; tends toward individualism and self-sufficiency; he likes the beautiful insignia of pomp and power, but opposes political activity when it makes for the repression of individuality; is likely to confuse beauty with purer religious experience.

4. SOC Social: The highest value for this type is love of people; he is measured for his altruism and philanthropy; prizes other persons as ends, and is therefore kind, sympathetic, and unselfish; regards love as itself the only suitable form of human relationship; in its purest form the social interest is selfless and tends to approach very closely the religious attitude.

5. PO Political: The political man is interested primarily in power; his activities are not necessarily within the narrow range of politics but within his vocation; competition and struggle play a large part in this man's life; he also has a desire for a direct expression of competition and struggle; he wishes above all else for personal power, influence, and renown.

6. REL Religious: The highest value of this man may be called unity; he is mystical, seeks to comprehend the cosmos as a whole and to relate himself to its embracing totality; some find their religious experience in the



affirmation of life and in active participation therein;  
some find the experience of unity through self-denial and  
meditation.

## APPENDIX B

### EPPS VARIABLES DEFINED

These brief definitions of the variables of the EPPS were excerpted from the Edwards Personal Preference Schedule Manual by Edwards, pages 11 and 15.

1. ACH Achievement: To do one's best, to be successful, to accomplish something of great significance, to do a difficult job well, to solve difficult problems and puzzles, to be able to do things better than others, to write a great novel or play.

2. DEF Deference: To get suggestions from others, to find out what others think, to follow instructions and do what is expected, to praise others, to tell others that they have done a good job, to accept the leadership of others, to read about great men, to conform to custom and avoid the unconventional, to let others make decisions.

3. CED Order: To have written work neat and organized, to make plans before starting on a difficult task, to have things organized, to keep things neat and orderly, to make advance plans when taking a trip, to organize details or work, to keep letters and files according to some system, to have meals organized and a definite time for eating, to have things arranged so that they run smoothly without change.

4. EXH Exhibition: To say witty and clever things, to

tell amusing jokes and stories, to talk about personal adventures and experiences, to have others notice and comment upon one's appearance, to say things just to see what effect it will have on others, to talk about personal achievements, to be the center of attention, to use words that others do not know the meaning of, to ask questions others cannot answer.

5. AUT Autonomy: To be able to come and go as desired, to say what one thinks about things, to be independent of others in making decisions, to feel free to do what one wants, to do things that are unconventional, to avoid situations where one is expected to conform, to do things without regard to what others may think, to avoid responsibilities and obligations.

6. AFF Affiliation: To be loyal to friends, to participate in friendly groups, to do things for friends, to form new friendships, to make as many friends as possible, to share things with friends, to do things with friends rather than alone, to form strong attachments, to write letters to friends.

7 INT Intraception: To analyze one's motives and feelings, to observe others, to understand how others feel about problems, to put one's self in another's place, to judge people by why they do things rather than by what they do, to analyze the behavior of others, to analyze the motives of others, to predict how others will act.

8. SUC Succorance: To have others provide help when in trouble, to seek encouragement from others, to have others be kindly, to have others be sympathetic and understanding about personal problems, to receive a great deal of affection from others, to have others do favors cheerfully, to be helped by others when depressed, to have

others feel sorry when one is sick, to have a fuss made over one when hurt.

9. ICM Dominance: To argue for one's point of view, to be a leader in groups to which one belongs, to be regarded by others as a leader, to be elected or appointed chairman of committees, to make group decisions, to settle arguments and disputes between others, to persuade and influence others to do what one wants, to supervise and direct the actions of others, to tell others how to do their jobs.

10. ABA Abasement: To feel guilty when one does something wrong, to accept blame when things do not go right, to feel that personal pain and misery suffered does more good than harm, to feel the need for punishment for wrong doing, to feel better when giving in and avoiding a fight than when having one's own way, to feel the need for confession of errors, to feel depressed by inability to handle situations, to feel timid in the presence of superiors, to feel inferior to others in most respects.

11. NUB Nurturance: To help friends when they are in trouble, to assist others less fortunate, to treat others with kindness and sympathy, to forgive others, to do small favors for others, to be generous with others, to sympathize with others who are sick or hurt, to show a great deal of affection toward others, to have others confide in one about personal problems.

12. CHG Change: To do new or different things, to travel, to meet new people, to experience novelty and change in daily routine, to experiment and try new things, to eat in new and different places, to try new and different jobs, to move about the county and live in different places, to participate in new fads and fashions.

13. END Endurance: To keep at a job until it is finished, to complete any job undertaken, to work hard at a task, to keep at a puzzle or problem until it is solved, to work at a single job before taking on others, to stay up late working in order to get a job done, to put in long hours of work without distraction, to stick at a problem even though it may seem as if no progress is being made, to avoid being interrupted while at work.

14. EET Heterosexuality: To go out with members of the opposite sex, to engage in social activities with the opposite sex, to be in love with someone of the opposite sex, to be regarded as physically attractive by those of the opposite sex, to participate in discussions about sex, to read books and plays involving sex, to listen to or to tell jokes involving sex, to become sexually excited.

15. AGG Aggression: To attack contrary points of view, to tell others what one thinks of them, to criticize others publicly, to make fun of others, to tell others off when disagreeing with them, to get revenge for insults, to become angry, to blame others when things go wrong, to read newspaper accounts of violence.

16. CON Consistency Score: This scale measures the consistency of the test taker in giving the same answer to the same questions as there are 15 questions which are duplicated on this test.



## APPENDIX C

### MMPI VARIABLES DEFINED

The following information was extracted from An MMPI Handbook by Dahlstrom and Welsh.

1. I Lie Score: was first introduced to evaluate the subject's general frankness; is sensitive to tendency to cover up and deny undesirable personal faults (especially those which are gross and naively executed); affected by self-defensive motives; may indicate emotional repressiveness; distribution of scores is normally skewed at the low end of scale.

2. F Validity: deals with peculiar thoughts and beliefs, apathy, lack of interest in things, denial of social ties; interpersonal items relating to family relationships or childhood experiences; some items deal with religion, attitudes toward law, adequacy of sleep; statements of psychiatric symptoms.

3. K Correction Factor: a measure of test-taking attitude which appears either as personal defensiveness or as an exhibition of personal defects and troubles.

4. M1 Hypochondriasis: measures personality characteristics related to the neurotic patterns of hypochondriasis; subjects show abnormal concern for their bodily functions; worry over health restricts range of activities and interpersonal relations; classic picture



includes egocentricity, immaturity; interpreted as a symptom scale.

5. M2 Depression: measures the degree or depth of the clinical symptom pattern of depression; characterized by pessimism of outlook on life and the future; feelings of hopelessness or worthlessness; slowing of thought and action and preoccupation with death and suicide; reflects depressive mood changes on a neurotic basis.

6. M3 Conversion Hysteria: developed to aid in the identification of patients using the neurotic defenses of the conversion form of hysteria; uses physical symptoms to solve difficult conflicts or to avoid mature responsibilities; shows symptoms only before a breakdown while in ordinary circumstances no clear personality inadequacy is readily demonstrable.

7. M4 Psychopathic Deviates: measures personality characteristics of the amoral and asocial subgroup of persons with psychopathic personality disorders; pattern includes a repeated and flagrant disregard for social customs and mores, an emotional shallowness in relation to others, particularly in sexual and affectual display; does not show anxiety until in serious difficulty when must show evidence of a sense of responsibility, appreciation of social patterns, or personal and emotional loyalties.

8. M5 Male Sexual Inversion: measures those personalities which though male engage in homoerotic practices as part of their feminine emotional makeup; factor appears in person's values, attitudes and interests, and styles of expression and speech, as well as sexual relationships.

9. M6 Paranoia: evaluates a person's set of

delusional beliefs (reference, influence, and grandeur); usually points out misperceptions of life situations that are markedly out of keeping with one's ability and intelligence.

10. M7 Psychasthenia: evaluates the neurotic pattern of the obsessive-compulsive syndrome; shows abnormal fears, worrying, difficulties in concentration, guilt feelings, and excessive vacillation in making decisions; shows excessively high standards on morality or intellectual performance, self-critical or even self-debasing feelings and attitudes, and assumption of rather remote and unemotional aloofness from some personal conflicts.

11. M8 Schizophrenia: identifies in terms of bizarre or unusual thoughts or behavior; personality is usually constrained, cold, and apathetic or indifferent; is usually seen as remote and inaccessible and sufficient unto himself; delusions of organization, hallucinations (either fleeting or persistent and compelling) and disorientation may appear; frequently performs below the levels expected on the basis of training and ability.

12. M9 Hypomania: characterized by overactivity, emotional excitement, and flight of ideas; activity may show good accomplishments but frequently is inefficient and unproductive; mood may be good-humored euphoria, but may on occasion be irritable with temper outbursts; may try to take on more than the person can handle; has a transitory pattern.

13. M0 Social Introversion: characterized by withdrawal from social contacts and responsibilities; shows little real interest in people.

14 AB First Factor: measures first major source of

variance running through the basic clinical scales; source of variance appears to be personal discomfort or distress; also described as anxiety or general emotional upset.

15. R Second Factor: measures second major source of variance in the scale; relates to a dependence upon mechanisms of denial and rationalization and to a lack of effective self-insight.

16. ES Ego Strength: used to measure the degree of improvement individual shows after psychotherapy over pretreatment attributes; expresses vitality, drive, self-confidence, realism, broadmindedness.

17. LB Low Back Pain: identifies functional cases of verified intervertebral disc pathology as compared with complaints from those who have no demonstrable vertebral disease.

18. CA Caudality: used to help evaluate the cause of a personality status before surgery and how it may be caused by a relatively restricted cerebral lesion. Expresses anxiety, depression, withdrawal, low self-esteem.

19. DY Dependency: measures the strength of dependency of a patient with his therapist and patterns which might lead to undue prolongation of a therapeutic relationship because the patient is trying to satisfy his need for dependence.

20. DO Dominance: expressed by social initiative, leadership ability, persistence and strong and forceful actions, successful in predicting staff ratings and peer nominations for dominance and in identifying outstanding leaders in high school programs.

21. SRE Social Responsibility: indicated by willingness to take the consequences of one's own behavior and by trustworthiness, dependability, and a sense of obligation to the group.

22. FR Prejudice: high scorers are described as prudish, religious and rigid; this scale is susceptible to deliberate faking of various degrees of prejudice.

23. ST Social Status: characterized as being sensitive to one's "status" or standing in the community; concerned with opinions others hold about oneself.

24. CN Control: tries to demonstrate the amount of overlapping between personality and validity scales; developed to show that the difference between persons with equal MMPI scores who are either treated in a hospital or as an outpatient is one of personality control. Measures self-control or self-maintenance.



## SPSS PROGRAM CONTROL CARDS

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SOC, AVL SOCIAL/ PO, AVL POLITICAL/ REL, AVL RELIGIOUS/  
 ASCEND, ASCENDANCE/ SUBMISSION/  
 CALIFF, CALIFORNIA/ F TEST/ ACH, EPPS ACHIEVEMENT/ DEF, EPPS DEFER  
 ENCE/ ORD, EPPS ORDER/ EXH, EPPS EXHIBITION/ AUT, EPPS AUTONOMY/  
 AFF, EPPS AFFILIATION/ INT, EPPS INTRACETION/ SUC, EPPS SUCCORAN  
 CF/DOM, EPPS DOMINANCE/ABA, EPPS ABASEMENT/NUR, EPPS NURTURANCE/  
 CHG, EPPS CHANGE/END, EPPS ENDURANCE/HET, EPPS HETEROSEXUALITY/  
 AGG, EPPS AGGRESSION/CON, EPPS CONSISTENCY SCORE/  
 L, MMPI LIE SCORE/ F, MMPI VALIDITY/  
 K, MMPI CORRECTION/  
 M1, MMPI HYPOCHONDRIASIS/M2, MMPI DEPRESSION/  
 M3, MMPI CCNVERSION Hysteria/  
 M4, MMPI PSYCHOPATHIC DEVIATES/  
 M5, MMPI MALE SEXUAL INVERSION/M6, MMPI PARANOIA/  
 M7, MMPI PSYCHASTHENIA/ M8, MMPI SCHIZOPHRENIA/  
 M9, MMPI HYPOMANIA/  
 M0, MMPI SOCIAL INTROVERSION/ AB, MMPI FIRST FACTOR/  
 R, CA, MMPI SECOND FACTOR/ES, MMPI EGO STRENGTH/LB, MMPI LOW BACK PAI  
 N/CA, MMPI CAUDALITY/DY, MMPI DEPENDENCY/DO, MMPI DOMINANCE/  
 SRE, MMPI SOCIAL RESPONSIBILITY/PR, MMPI PREJUDICE/ST, MMPI SOCIA  
 L STATUS/CN, MMPI CONTROL/DOC, CPI DOMINANCE/  
 CS, CPI CAPACITY FOR STATUS/ SY, CPI SOCIABILITY/  
 SP, CPI SOCIAL PRESENCE/ SA, CPI SELF ACCEPTANCE/  
 WB, CPI SENSE OF WELL BEING/ RE, CPI RESPONSIBILITY/  
 SO, CPI SOCIALIZATION/SC, CPI SELF CONTROL/TOL, CPI TOLERANCE/  
 GI, CPI GOOD IMPRESSION/CM, CPI COMMUNITY/AC, CPI ACHIEVEMENT V  
 IA, CONFORMANCE/AT, CPI ACHIEVEMENT VIA INDEPENDENCE/IE, CPI INTEL  
 LECTUAL EFFICIENCY/PY, CPI PSYCHOLOGICAL MINDEDNESS/FX, CPI FLEXI  
 BILITY/FE, CPI FEMININITY/  
 O4STD, STANDARDIZED OPPORTUNITY SCORE TO LCDR/  
 O5STD, STANDARDIZED OPPORTUNITY SCORE TO CDR/  
 O6STD, STANDARDIZED OPPORTUNITY SCORE TO CAPT/  
 STD AVER, OVERALL STANDARDIZED INDIVIDUAL AVERAGE/  
 KIDS, EM, CAPT (0)NO/ST APPLICABLE (1)YES (2)NO/  
 GRADSTAT (0)UNKNOWN (1)MASTERS (2)NO CERT COMPLETE/ (3)BACHELORS/  
 MARSTAT (0)UNKNOWN (1)YES (2)NO/ RANK (1)WIFE DECEASED/  
 QTRS (0)BOQ (1)YES (2)NO/ NEW ENGLAND (2)LTJG (3)LT (4)LCDR  
 (5)CDR (6)CAPT/ AREAT (1)NEW ENGLAND (2)NORTH (3)ILLINOIS  
 (4)SOUTH (5)SOUTHWEST (6)FOREIGN COUNTRY/ SEX (0)MALE (1)FEMALE/  
 (9)HAWAII AND ALASKA (0)FOREIGN COUNTRY/ SEX (0)MALE (1)FEMALE/  
 DESIG (1)1XX LINE (2)130X AVIATION (3)140X EDC (4)161X CRYPTO  
 (5)163X INTELLIGENCE (6)1310X SUPPLY (7)1510X CEC (8)230X MSC  
 (9)OTHERS (0)151X AEDD/ SOURCE (0)PCS (1)ANNAPOLIS (2)ADCS  
 (3)INROTC (4)ENLISTED PROG/ MILFAM (5)UNKNOWN (6)OTHER ACADEMY  
 (7)ROC (8)NAVCA (9)NESEP/ PROG/ MILFAM (0)CDR OR UP IN FAMILY (1)YES  
 (2)NO/ PROREC (0)NORMAL (1)DEEP ONCE (2)DEEP TWICE OR MORE  
 (3)LATE ONCE (4)LATE TWICE OR MORE (5)PASS OVER (6)COMBINATION  
 (7)RESIGNED (8)RETIRED (9)UNKNOWN/ DEGREE (0)BA (1)BS (2)OTHER/

# VALUE LABELS



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AS,AVL,CALF,EPPS,SOR,MMPI,CPI,MOS,LPCW (0)DID NOT TAKE TEST
(1)TOOK TEST/
04STD (53)PASSED OVER (61)LATE (99)NORMAL (132)DEEP/
05STD (0)NOT APPLICABLE (74)PASSED OVER (81)LATE (101)NORMAL
(129)DEEP/ 06STD (0)NOT APPLICABLE (86)PASSED OVER
(97)LATE (109)NORMAL (134)DEEP/
MISSING VALUES  MATH(0)/ VERBAL(0)/ AGE(0)/GPANPS(0)/TH TO REL (0)/
ASCEND(99)/CALIFF(0)/ACH TO INT (0)/SUC(99)/DOM(0)/ ABA(99)/
NUP TO CON(0)/L TO CY (0)/ DQC TO FE (0)/
04STD 05STD 06STD (0)/
*** SUBPROGRAM ***
REAC INPUT DATA
*** RAW DATA CARDS GO HERE IF INPUT MEDIUM IS "CARD" ***
FINISH

```

# APPENDIX E

## SPSS RAW DATA CARDS

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[illegible]

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7235					7
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					0
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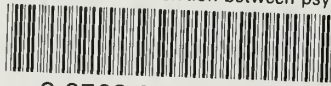
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